

Message Text

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ACTION ERDA-07

INFO OCT-01 EUR-12 ISO-00 ERDE-00 ACDA-10 CIAE-00 INR-07

IO-13 L-03 NSAE-00 NSC-05 EB-08 NRC-07 OES-06 FEAE-00

DODE-00 /079 W

-----241350 027080 /41

P 241302Z FEB 77

FM AMEMBASSY PARIS

TO SECSTATE WASHDC PRIORITY 0003

UNCLAS SECTION 01 OF 02 PARIS 05469

DEPT PLEASE PASS ERDA/HELFRICH AND YEVICK

E.O. 11652: N/A

TAGS: ENRG, FR

SUBJECT: STATUS OF PHENIX LMFBR DEMONSTRATION PLANT

REF: ERDA TELEX FEB 23 AND TELCON REQUEST FROM

MC DONOUGH/ERDA

FOLLOWING IS BASED ON INFORMATION OBTAINED BY THE PARIS
EMBASSY ERDA SCIENTIFIC REPRESENTATIVE DURING VISIT TO
THE PHENIX PLANT AT THE MARCOULE CENTER ON FEBRUARY 17,
1977:

1. STATUS:

1.1. PLANT IS SHUT DOWN WITH DISASSEMBLED
INTERMEDIATE HEAT EXCHANGER (IHX) COMPONENTS AWAITING
THE ARRIVAL OF THE REDESIGNED SECONDARY SODIUM DOWNCOMER
-SODIUM UPPER EXIT TUBE UNIT, SO THAT IHX ASSEMBLY CAN
PROCEED.

1.2. IF NO UNANTICIPATED PROBLEMS ARISE, THE
PLANT IS EXPECTED TO BE OPERATING AT 2/3 POWER BY
MID-MAY.

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1.3. SO FAR TWO IHX'S HAVE FAILED IN TWO OUT OF
THREE LOOPS OF THE PLANT. THE FAILURE OF THE REMAINING
FOUR IHX'S OF THE INITIAL DESIGN MAY BE IMMINENT. THE
PLANT WILL BE OPERATED AT 2/3 POWER UNTIL ALL IHX'S ARE
REPAIRED. HOWEVER, IF AN IHX FAILS IN ONE OF THE TWO
OPERATING LOOPS, A PLANT SHUTDOWN WILL BE REQUIRED.

ON THE BASIS OF CURRENT KNOWLEDGE, REPAIR OF AN IHX
REQUIRES ABOUT THREE MONTHS.

1.4. AS A BACK-UP IN CASE OF UNANTICIPATED
PROBLEMS, A NEW IHX IS ON ORDER AS WELL AS LONG-TERM
DELIVERY ITEMS FOR ADDITIONAL IHX'S. DELIVERY OF A
NEW IHX REQUIRES ABOUT TWO YEARS.

2. DETAILS OF IHX PROBLEM.

2.1. A LEAK DEVELOPED BETWEEN THE HORIZONTAL TOP
PLATE AND THE INNER TUBE OF THE SECONDARY SODIUM EXIT
LINE AT THE UPPERMOST END OF THE IHX NEAR THE LEVEL OF
THE HORIZONTAL SECONDARY SODIUM EXIT PIPE FROM THE IHX
ENVELOPE. SODIUM LEAKED INTO THE ARGON-FILLED GAP
SPACE BETWEEN SECONDARY SODIUM ENTRANCE DOWNCOMER AND
INNER EXIT TUBES AND FORCED ITSELF PAST THE GAS SEAL
INTO THE AIR ABOVE THE REACTOR TOP.

2.2. IN RETROSPECT, THE PROBLEM MIGHT HAVE BEEN
ANTICIPATED AND IS CONSIDERED TO HAVE RESULTED FROM
EXPANSION STRESSES IN LONG TUBES AT DIFFERENT
TEMPERATURES (DELTA T BETWEEN TUBES IS 150 DEGREES C.
AND EXPANSION IS OVER A LENGTH OF 12 METERS FROM THE

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BOTTOM SUPPORT POINT). ALSO, THE JUNCTION DESIGN WAS
UNFORTUNATE IN THAT MATERIAL THICKNESSES AT THE
JUNCTION WERE NOT WELL MATCHED. THIS TWO-TUBE

SECONDARY SODIUM ENTRANCE-EXIT ASSEMBLY NOW HAS BEEN
REDESIGNED TO SOLVE THIS PROBLEM.

3. MISCELLANEOUS.

3.1. PHENIX HAS HAD AN 84 AVAILABILITY DURING
THE FIRST YEAR OF ITS POWER OPERATION, 74 DURING THE
SECOND YEAR (THE IHX PROBLEM OCCURRED IN THE THIRD
YEAR).

3.2. CEA HAS BEEN PLEASANTLY SURPRISED WITH THE
RELATIVE EASE WITH WHICH THEY WERE ABLE TO WORK ON THE
DAMAGED IHX'S. ACTIVITY TRANSPORT APPEARS TO BE LESS
THAN IN WATER REACTORS. ACTIVITY AT THE OUTER EDGE
OF THE IHX TUBE BUNDLE ASSEMBLY WAS REPORTED TO BE
ABOUT 40 MILLIROENTGENS PER HOUR, WHICH IS CUT TO 2 MR
PER HOUR BY A THIN SHEET OF LEAD OVER THE OUTER
CYLINDER. THE IHX'S WERE ACCESSIBLE AFTER 10 DAYS OF
COOLING. INSTALLATION OF AN IHX IS ESTIMATED TO TAKE
ONE DAY AND THE REQUIRED CONNECTIONS ONE TO TWO WEEKS.
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THE FIRE RESULTING FROM THE SODIUM LEAK INTO THE AIR
ABOVE THE REACTOR WAS HANDLED EASILY AND DID NOT CAUSE
ANY DAMAGE WHICH WOULD REQUIRE REPLACEMENT OF NEARBY
EQUIPMENT.
RUSH

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Message Attributes

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Disposition Approved on Date:
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Disposition Comment:
Disposition Date: 01-Jan-1960 12:00:00 am
Disposition Event:
Disposition History: n/a
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